N.A.C.A. BULLETIN

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VOL. XXX, NO. 9 JANUARY 1, 1949

EDITORIAL DEPARTMENT NOTE

Our first article, by a writer who casts his lot with the first-in first-out basis as the preferable method of reporting costs, come inflation or deflation, proposes that, for purposes of comparison, successive years' statements be worked back to the dollars of a selected year through the application of appropriate price indexes.

The author, JAMES E. HEFFNER, is a member of the staff of Touche, Niven, Bailey & Smart, Cleveland, Ohio.

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A standard cost procedure for developing usage variances created in each cost center of a large steel mill and for consolidating the reports into statements applicable to each level of operating authority is reported upon in our second article, together with the place held by this procedure in the operation of the standard cost system as a whole.

The article is written under the joint authorship of M. D. WELLS, Comptroller of Carnegie-Illinois Steel Corp., Pittsburgh, Pa., and of J. H. ELLIOTT and W. P. MARQUIS, General Superintendent and Works Auditor, respectively, of the company's Irvin Works.

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A report studded with graphic representations needs more than pictorial appeal to carry weight from month to month. It must also have evident relationship to the figures and operating facts for which it stands. Such a reporting procedure, recapitulating the operation of a standard cost system and devised to inform top management and its various segments in one plant of a major company, is presented in our third article.

C. W. BENDEL, the author, is Chief Cost Accountant, New Holland Machine Division, The Sperry Corp. Mr. Bendel has had diversified industrial accounting experience. He is a former contributor to the *Bulletin*.

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A sales budgeting method intended to establish effective liaison between production and known customer needs in a paper company processing some 250 product items is presented in our fourth article.

D. E. MERRIFIELD, the author, is Cost Accountant and Industrial Engineer of the Specialty Papers Co., Dayton, Ohio.

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Leveling production peaks and serving the company's customers better and more economically comprise the twin objectives of the public warehousing procedure narrated in the next to last article in this issue.

The author of the paper is RICHARD J. HALLORAN, Assistant to the Controller, York Corp., York, Pa.

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Some differences thought to exist between commercial ventures and manufacturing enterprises appear to vanish in the course of our final article as the considerations which require cost accounting in banks, and the techniques appropriate to it, are outlined.

This presentation is offered by ARNOLD J. RYDEN, JR., Supervisor of Cost Accounting, Northwestern National Bank, Minneapolis, Minn.

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JANUARY 1, 1949

THE DILEMMA ABOUT PROFITS—ADJUSTING THE STATEMENTS TO BASE YEAR DOLLARS

by JAMES E. HEFFNER,
Member of Staff, Touche, Niven, Bailey & Smart,
Cleveland, Ohio.

UPON entering the accounting profession today the young accountant observes the impact of sharply advancing prices on operations themselves and on reports reflecting results of operations. It seems that the familiar measuring stick, the United States dollar, has failed us. Controversy exists among well-known accounting and business authorities respecting the appropriate basis for reporting profits. Question is raised as to the adequacy of the balance sheet and profit and loss statement to reflect the situation properly. In addition, the accounting principles and procedures under which these statements are prepared are likewise brought into question. The discussions tend to center on the questions of (1) inventory cost finding and valuation methods ("fifo," average cost, "lifo," etc.), and (2) depreciation of fixed assets (actual cost versus depreciation on replacement costs). The issues under discussion all tend to point to the basic question, "What are the net profits of a going business concern?" To put it another way, "What, exactly, are we attempting to show in statements of profit and loss?"

Rationale of Actual Cost Basis

Let us attempt to establish a chain of reasoning in respect of these broad questions and see where we come out. If profits of a going concern represent gross intake of monies (accrued or cash), less the cost of materials, labor, and expenses used to produce this intake, then we must know actual costs to determine profits. Actual costs are necessarily specific costs but it is commonly impracticable to identify them in this way. If, in industrial operations generally, inventories, plant and equipment, and items represented by prepaid expenses and deferred charges are ordinarily consumed in order of acquisition, the first-in, first-out basis of stating results of operations reflects these operations with substantial accuracy even though there may be frequent instances of concurrent consumption of successively acquired items resulting in earlier exhaustion of the more recent purchases and occasional instances of clear-cut use of items in reverse order of acquisition.

Therefore, if on the profit and loss statement there is deducted from revenue the original cost of goods and services used to produce it and if the balance sheet shows the original cost of goods and services not yet used—both upon the assumption, in the absence of evidence related to specific items, that earliest acquisitions are first consumed—we shall not be far from the facts. In other words, are not most business assets purchased and used on the "fifo" principle?

"Fifo," not "Lifo," for Actual Costs

If this theory of what profits are (actual cost theory of profits), is accepted, there should be consistency throughout. Original costs should follow the actual goods and services at all times and the "fifo" principle should be used for all prepayments, regardless of whether they are long-term or current, tangible or intangible. To follow this consistency in respect of inventory valuation, it appears that the "fifo" method of costing is appropriate. The use of the average cost method, on the premise that all inventory is not actually used item by item on a "fifo" basis but that some goods purchased later are used before the items purchased previously, might be accepted. This would give a fair approximation of the cost of the actual goods used. However, "lifo" is clearly not consistent with the actual cost theory of profits. It is not likely, although it is possible and may occur to some extent in certain industries, that goods are used for manufacture or resale by management intentionally on the "lifo" basis.

As to fixed assets, which may be regarded as long-term prepayments of expense, they must be depreciated on the basis of actual costs only, if the actual cost theory of profits is to be accepted. Furthermore, to be completely consistent the undepreciated portion of an item of fixed assets should be carried in the balance sheet as a long-term prepayment at the actual undepreciated cost only. An appraisal figure in the balance sheet is inconsistent with the actual cost theory of profits. If the market or replacement value need be shown for such purposes as insurance, credit, etc., it can be shown effectively as part of the caption or as a footnote.

Rationale of Replacement Cost Basis

The actual cost theory of profits has given a satisfactory answer to all concerned while the dollar was relatively a stable unit of measure. However, when this unit fluctuates to the extent that it

has in very recent years, some say that profit and loss statements predicated upon the actual cost theory of profits result in a statement which lacks homogeneity. It is charged that the dollar used for income differs from the dollar used for the costs of goods and services in many instances and that the result is a meaningless profit figure.

It is held that profit is, rather, the difference between current revenue and the current replacement costs of the goods and services used to produce the revenue. By this theory, the original costs are not consumed unless impaired in a quantitative sense and are carried forward in the balance sheet indefinitely. Balance sheet items lose their character of prepayments and assume a character of original investments, whether fixed assets, inventories, working funds, or other requirements of a going concern. It is assumed that predetermined quantities will be needed at all times in order to carry on the business and that these quantities should be carried continuously at their original cost, regardless of whether or not items included in the purchase of the base quantity have been replaced. The cost of the original quantities up to quantities required for the current scale of operations would still remain on the books as (in effect) an investment and all subsequent purchases would be charged to operations. This theory is well exemplified by the "lifo" and base stock theories of inventory.

The extreme divergence of results obtained by actual and replacement cost theories over a period of time highlights the need for consistency in application. Once either one of the theories has been adopted, it should be followed all the way and a full disclosure should be made of the theory followed. To value inventory on a "lifo" basis and at the same time to depreciate fixed assets on an original cost basis is inconsistent.

The author's preference is for the use of the actual cost theory of profits. The replacement cost theory more nearly matches dollars of revenue and expense which have equal purchasing power, but this result is, itself, hardly natural to inflationary or deflationary periods. There is more to be said for measuring the effect of inflation on profits. The actual cost theory ties accounting closely to business transactions, more susceptible of verification than less well-anchored amounts would be, and gives reliable profit amounts and good comparative results in periods during which the dollar remains relatively stable.

THE GENERAL BUSINESS CORPORATION
Adjustment of Comparative Balance Sheets to A Common Dollar Basis

	Actual cost basis			*Price index standings*			*Adjusted to 1926 dollars*		
Assets	*1947*	*1946*	*1945*	*1947*	*1946*	*1945*	*1947*	*1946*	*1945*
Current assets:									
Cash and receivables—net	$ 45,900	$ 44,535	$ 42,100	156	120	105	$ 29,423	$ 37,113	$ 40,095
Temporary investments—at cost	20,150	20,000	25,800	149	141	137	13,523	14,184	18,832
Prepayments	2,500	2,350	2,200	156	123	108	1,603	1,911	2,037
Inventories—at lower of cost (first in-first out basis) or market	40,000	38,900	37,000	167	135	117	23,952	28,815	31,623
Total current assets	108,550	105,785	107,100				68,501	82,023	92,587
Investments and other assets—at cost less depreciation or amortized premium	10,000	2,525	2,050	*	**	***	6,805	1,882	1,546
Property, plant, and equipment—at cost less reserves for depreciation	52,200	53,400	44,500	†	††	†††	52,030	53,233	46,842
Deferred charges	150	160	170	79	79	79	190	203	215
Total assets	$170,900	$161,870	$153,820				$127,526	$137,341	$141,190
Liabilities and Net Worth									
Current liabilities:									
Notes and accounts payable	$ 13,100	$ 15,100	$ 14,000	167	135	117	$ 7,844	$ 11,185	$ 11,966
Accrued salaries and wages	4,800	3,200	2,700	236	208	193	2,034	1,538	1,399
Accrued taxes	21,000	13,500	22,000	156	120	105	13,462	11,250	20,952
Other accrued liabilities	2,500	1,700	1,400	156	123	108	1,603	1,382	1,296
Total current liabilities	41,400	33,500	40,100				24,943	25,355	35,613
Bonds payable—6%, first mortgage, 20 year	—0—	19,000	19,000	103	103	103	—0—	18,447	18,447
Net worth:									
Capital stock—6,000 shares, no par common	65,500	65,500	65,500	79	79	79	82,911	82,911	82,911
Earned surplus	64,000	43,870	29,220				19,672	10,628	4,219
Total net worth	129,500	109,370	94,720				102,583	93,539	87,130
Total liabilities and net worth	$170,900	$161,870	$153,820				$127,526	$137,341	$141,190

* $8,425-149 ** $950-130 *** $975-130 † $9,700-133 †† $9,900-133 ††† $95

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Price Index Adjustments to Obtain Comparable Figures

In periods of inflation or deflation, the actual cost theory does produce what may be designated as distortions. While true actual profit by the actual cost theory, it is distorted for the purposes of analysis, interpretation, and comparison because it includes economic cycle factors to a different degree from year to year. However, for purposes of analysis, interpretation, and comparison, the current dollars appearing in the statements each year could well be converted to base period dollars, affording a comparison of results from year to year that would be void of all price fluctuation factors and would show clearly the degree of efficiency of operation.

This situation might be compared to the results now obtained in standard cost systems when variances are analyzed. Variances are separated into price, usage, and volume variances, etc., and inquiry is made into the reasons for each. With the use of an index system applied to the income statement, the price variance, i.e., the variation in profits due to inflationary causes, would be eliminated, at least to the degree that it did not represent the amount by which the prices or rates incurred by a particular company were above or below the average for all businesses. Such statements, adjusted from actual costs, would seem to give much better analyses and comparisons than statements prepared on the replacement cost theory of profits with its attendant difficulties of applications, and would seem more meaningful and more readily related to the facts from which they originate.

Conversion of profit and loss statements from actual costs to base period dollars for comparative and analytical work would be necessary only in periods of inflation or deflation. In periods of stable dollars, the actual cost theory of profits gives good comparative results without such a conversion. Base period dollars would be the same as current year dollars if the price index remained relatively the same from year to year.

In Exhibits 1 and 2, an attempt has been made to show, in what might be called a pro forma manner, the results which could be expected if the balance sheet and profit and loss statements for a series of recent years, prepared at actual costs, were adjusted to 1926 dollars by applications of appropriate index standings to individual items. All amounts used are fictitious. However, an attempt has been made to illustrate a situation representative of business in general for the respective years indicated.

THE GENERAL BUSINESS CORPORATION

Adjustment of Compartive Profit and Loss Statements to A Common Dollar Basis

	Actual cost basis			*Price index standings*			*Adjusted to 1926 dollars*		
	1947	*1946*	*1945*	*1947*	*1946*	*1945*	*1947*	*1946*	*1945*
Sales—net	$330,000	$202,450	$181,727	156	120	105	$211,538	$168,708	$173,073
Cost of goods sold	264,000	161,450	147,527	167	135	117	158,084	119,593	126,091
Gross profit	66,000	41,000	34,200				53,454	49,115	46,982
Operating expenses									
Salaries and wages	7,700	5,400	4,500	236	208	193	3,263	2,596	2,332
Depreciation	1,200	1,100	1,000	*	**	95	1,240	1,203	1,053
Other expenses	7,100	4,500	3,600	156	123	108	4,551	3,659	3,333
Total operating expenses	16,000	11,000	9,100				9,054	7,458	6,718
Net operating profit	50,000	30,000	25,100				44,400	41,657	40,264
Other income—net	1,700	1,150	1,000	156	120	105	1,090	958	952
Net profit before Federal income taxes	51,700	31,150	26,100				45,490	42,615	41,216
Provision for Federal income taxes	20,000	12,500	21,000	156	120	105	12,821	10,417	20,000
Net profit after taxes	31,700	18,650	5,100				32,669	32,198	21,216
Loss due to purchase of assets at inflationary prices	—	—	—				16,208	22,456	18,478
Net profit carried to earned surplus	31,700	18,650	5,100				16,461	9,742	2,738
Earned surplus:									
Balance—beginning of year	43,870	29,220	28,180				10,628	4,219	5,348
Total	75,570	47,870	33,280				27,089	13,961	8,086
Dividends declared	11,570	4,000	4,060	156	120	105	7,417	3,333	3,867
Balance—end of year	$ 64,000	$ 43,870	$ 29,220				$ 19,672	$ 10,628	$ 4,219

* $1,000-95, 200-133, 66-179. ** $1,000-95, 100-133.

EXHIBIT 2

Selection of the Indexes

The index amounts used in the exhibits are also fictitious, yet they too are intended to show the general trend in prices for the respective items with which they are used. Where a general price index is used, as explained below, the standings parallel the wholesale price index of the United States Department of Labor without necessarily reflecting it exactly. Base period (1926) dollar amounts are determined by dividing each amount by its respective index regarded as a decimal to two places. The result is the base year value of each item. Since all items, when adjusted, are expressed in terms of the same dollar, the statements can be analyzed, compared, and interpreted in this light.

To produce dependable results in the base period statements, great care must be exercised to apply a good representative index to each item in the current dollar statements. In the example, the following procedure was used which, it is believed, produces accurate amounts in terms of base period dollars for each of the balance sheet and profit and loss items:

> The average or over-all index for all commodities, i.e., the general price index, was used for income (sales and other income), cash and receivables, provision for Federal income taxes, accrued taxes, and dividends. This general index was used for these items because they all relate to in-flow or use of cash as such.
>
> Each of the other assets, liabilities, and related costs is intended to have the index which was effective at the time the item of asset or liability was acquired or incurred by the business. Thus, indexes in effect in prior years may be carried forward to statements of subsequent years. For example, each fixed asset carries the index in effect when it is purchased. In like manner each year's depreciation carries the respective indexes for the portion of the respective assets being depreciated in the current year.

Significance of the "Common Dollar" Amounts

An approach to the results as shown in Exhibit 2 might be:

> Although dollar gross profits were high in the past few years, the gross profits in base year dollars were higher by about twelve thousand dollars in 1945 and eight thousand dollars in 1946 but in 1947 they were some thirteen thousand

dollars below those shown by the current dollars. This may be partially attributed to the sharp rise in the price index for income for 1947 over 1946. This means that the increase in "real" income is comparatively less, for the increase in the current dollar income for 1947 is largely made up of inflationary factors. Since more of the increase is due to inflation, less of the increase is "real." Hence the comparative drop in gross profit for 1947 in terms of 1926 dollars.

It will be noted from the adjusted or base period balance sheets that earned surplus is not determined from an index but is the difference between the adjusted assets and the aggregate of adjusted liabilities and adjusted capital stock figure. From the base period profit and loss statements, it will be noted that net profit after taxes—adjusted income less adjusted costs—does not measure the gap between opening surplus (less adjusted dividends), and closing surplus. This gap is filled below net profit after taxes by an item labelled "Loss due to purchase of assets at inflationary prices." In other words, the base period surplus on the balance sheets indicates that more has gone out of the business in terms of base period dollars than is accounted for by the index adjustments applied to the profit and loss statements on the actual cost basis. Replacement of assets at successively higher price levels would bring about this result by substituting high index dollars for lower index dollars on the balance sheet, and this is assumed to be the principal cause.

A Way Out of the Dilemma

By converting profit amounts into base period dollars, management can analyze operating efficiency from year to year without considering any of the confusing factors of inflation or deflation. This once done, the inflationary loss or deflationary profit may be deducted or added to show to what extent the profitable results of operation have been affected by the economic cycle.

Thus it seems that it may be practicable to obtain, through the use of price indexes, statements prepared on the actual cost theory of profits and, at the same time, a conversion of these statements to base period dollars. It is, therefore, possible to maintain accounting on an actual cost basis and at the same time analyze the statements prepared from such data in such a manner as will bring to light the efficiency of operation, the loss due to inflation, and the "common dollar" value of net assets.

CONTROL USES OF STANDARD COSTS IN A STEEL MILL

by M. D. WELLS, Comptroller;
J. H. ELLIOTT, General Superintendent, Irvin Works; and
W. P. MARQUIS, Works Auditor, Irvin Works,
Carnegie-Illinois Steel Corp.,
Pittsburgh, Pa.

ANY cost system may be expected to accomplish three things:

1. Give the executive and financial heads of the company sufficient information to intelligently administer financial policy.
2. Give the sales executives sound information with regard to product costs so that proper pricing structures can be built and desirable markets developed.
3. Give the operating heads complete and accurate information to permit the current control of manufacturing costs.

For the sake of this discussion, we are interested only in the last of the three functions. Only those features of the cost accounting system which relate to operating cost control are discussed at all fully. There are many other uses made of standard cost information by Carnegie-Illinois and the categories of the uses to which standard cost information may be put are even more numerous and cover the entire field of management. However, the control uses of standard costs are important and are often neglected. It is true that if we take the difference between actual and standard purchase prices to profit and loss as a price variance, if we handle charges and credits to cost centers and inventory accounts at standard values, and if we charge or credit the variance created in each cost center to profit and loss, we have a full-fledged standard cost system. Nevertheless, we still may be failing to supply to management all of the information needed for cost control. It is not enough merely to tell our operating management that the cost in a cost center was one amount and should have been some lesser amount. It is necessary to point the finger at the particular cost items which were excessive and, to the extent possible, indicate the reasons for the excessive cost.

Actual Unit Costs Inadequate for Control Purposes

How does our standard cost system work as a control over operating costs? Prior to standard costs, practically all of our manufacturing costs were controlled on an actual cost per ton basis. The actual per unit cost might be sufficient if every unit manufactured

were to the same specification, day in and day out. This is far from true in the steel business and particularly in the flat products field. As an example, take the tandem cold reduction mills at Irvin Works. An actual cost per ton on such a mill can be completely misleading. Such a mill can and does fluctuate widely in rolling rate per hour, power consumption per hour, and all the other important variables that make up cost. This is due to basic differences in the types of product rolled such as variations in width, thickness, grade of steel, surface finish, and quantity of the order. Under standard cost, we have developed standards for each set of conditions and judge the cost performance accordingly.

Almost any operating head who has attempted to control cost under a per unit cost system where wide fluctuations in product specifications occur, will quickly agree that some form of standard cost or budgetary control is essential. It is, of course, recognized that there are other accounting methods, besides our system of standard costs, of handling the cost control problems presented by product mix. It is simply pointed out here that, from an operating control standpoint, the recognition of product mix is essential and that our standard cost system handles the situation satisfactorily.

Assembling Costs By Operating Responsibilities

The assembly of costs under our standard cost system is not dictated by some preconceived accounting method. It is predicated upon the structure of each department. In other words, our costs are assembled by operating responsibilities and in complete accordance with the way that the operating organization has been built up. In a mill such as Irvin, the initial assembly of responsibility costs is at the level of general foreman and a financial responsibility statement is developed for all operations under him. Such a statement we call a cost center statement. These costs are developed in the first instance by individual operating units, but they are asembled finally into one statement representing the cost performance of that general foreman. As an example, in the responsibility statement of our General Foreman of Cold Reduction, there is covered the cost performance of the two five-stand tandem cold reduction mills, each of different speed and design; one three-stand cold reduction mill for rolling sheets, four electrolytic cleaning lines of two different designs, three sheet shearing units, and several other minor operations.

The responsibility statements of the several general foremen, together with certain overhead items of the department, are combined into one departmental statement which represents the responsibility statement of the department superintendent. One department superintendent will probably have from three to six general foremen under him. Finally, all of the department cost center statements are combined into one statement representing the cost performance of the plant as a whole.

Variances Recognized In the Standard Cost System

Standard allowances for fixed and variable expense are established, these allowances covering all permissible types of expense at any volume level for any type of product produced or service rendered by the cost center. Standard prices are established for all purchased commodities and services, these prices being those which are expected to prevail during the coming year or more. On the basis of these standard prices, prevailing labor rates, materials or services from other cost centers evaluated at standard cost, expected normal volume, and the standard allowances for fixed and variable expense, a standard cost per unit of product produced or service rendered by the cost center is developed. This standard cost is used in charges to inventory or to succeeding cost centers for the output of this cost center.

In order to develop the required segregation of variances, we have found it necessary to provide two budgets, a standard practice budget and a current (or work done) budget. The standard practice budget shows the allowed cost in the cost center for the products or services to be produced or rendered, on the assumption that standard practice as to materials and methods will be adhered to. The current budget shows the allowed cost on the basis of the particular materials and methods actually used. Through the use of these two budgets, we segregate the following variances:

1. *Volume variance.* Represents under- or overabsorption of fixed expense.
2. *Deviation variance.* Represents cost effect of deviations from standard practice materials or methods. This variance is further broken down by type of substitute material or other deviation from standard practice.
3. *Usage variance.* Represents cost effect of under- or overusage of materials, labor, or services. This variance is further broken down by type of expense.

Price variance is developed prior to the charging of purchased materials or services to cost centers. While we recognize and segregate a number of other types of variances, the four just mentioned are the ones of major importance. Price variance and volume variance are generally not stressed in discussions at plant level as these variances are not considered controllable by plant management. At Irvin Works, there are relatively few deviations from standard practice recognized in the cost system. The result is that responsibility for variance occurrence at this plant is mostly centered in usage variance.

The Cost Center Statement

Cost centers are established on the basis of responsibility for cost control, each cost center comprehending one activity (or a group of associated activities) and being under the supervision of a single individual who is responsible to management for cost control in the cost center. Every element of cost incurred at the plant is assigned to a cost center and the supervisor over that cost center is accountable for its control. Any difference between the total standard value of the output of the cost center and the total actual consumption of material, labor, and other "cost above" items at standard cost, i.e., actual quantities at standard prices and rates, is a variance created in that cost center, and is displayed in the final column of the sample Cost Center Statement, shown as Exhibit I, which will be the basis for the greater part of this discussion.

Such a statement is prepared at Irvin Works for each cost center, recognizing detailed operation of operating units as well as organizational responsibility at its lowest level for such unit operation. As mentioned earlier, these statements are consolidated into statements combining all the operations under the responsibility of individual general foremen and further consolidated into a statement portraying the monthly cost performance of an entire operating department or division and an all-inclusive consolidated cost center statement for the entire Irvin Works each month. The preparation of cost center statements in this manner provides an over-all view of the cost performance at each level of supervision and authority, which is essential for properly measuring and controlling costs.

It will be noted from the exhibit that the report is prepared basically in two sections. First, a material section and, second, a "cost above" section. Materials are expressed both in quantities

O-847 REV. 1-48
C.I.S. COMP.

COST CENTER STATEMENT
ANY WORKS

INDEX NO. 1

COST CENTER ANY MONTH ANY 1948

PERFORMANCE VARIANCE TYPE	DOLLARS	%
MATERIAL		
USAGE DEVIATION	3 216	99
—	—	
TOTAL	3 216	99
OPERATING LABOR		
USAGE DEVIATION	4 569	104
TOTAL	4 569	104
OTHER COST ABOVE		
USAGE DEVIATION	18 377	95
TOTAL	18 377	95
TOTAL COST		
USAGE DEVIATION	17 024	99
TOTAL	17 024	99

ANALYSIS OF R. & M. PREVIOUS 12 MONTHS

ACTUAL	USAGE VAR.
—	—
292 170	69 469
—	—
185 171	77 685
332 154	7 665
729 495	148 819

ANALYSIS OF DEVIATION VARIANCE CAUSE	DOLLARS
TOTAL	

STATISTICS

CLASSIFICATION OF EXPENSE	BUDGET FOR WORK DONE	ACTUAL AT STANDARD	USAGE VARIANCE
MATERIAL - QUANTITY			
Gross Material Charged	140 208	140 352	144
Scrap Recovered	1 663	1 807	144
TOTAL	138 545	138 545	
MATERIAL - DOLLARS			
Gross Material Charged	5 536 601	5 542 288	5 687
Scrap Recovered	28 519	30 990	2 471
TOTAL	5 508 082	5 511 298	3 216
COST ABOVE - DOLLARS			
OPERATING AND SERVICE LABOR	109 983	105 414	4 569
SUPERVISORY, TECHNICAL & CLERICAL LABOR	6 638	8 376	1 738
LABOR PREMIUM & RETROACTIVE PAYMENTS	-	5 622	5 622
REPAIR & MAINTENANCE LABOR (OWN RESP.)			
REPAIR & MAINTENANCE MATERIAL (OWN RESP. & OPER. MTCE.)	25 613	33 472	7 859
REPAIR & MAINTENANCE MATERIAL - CENTRAL SHOPS			
REPAIR & MAINTENANCE - OUTSIDE CONTRACT REPAIRS	36	6 285	6 249
REPAIR & MAINTENANCE LABOR SERVICE	32 986	39 118	6 132
TOTAL REPAIR & MAINTENANCE	58 635	78 875	20 240
Gaseous Fuels	12 812	11 561	1 251
Liquid Fuels	1 047	1 186	139
TOTAL FUELS	13 859	12 747	1 112
Electricity	24 221	23 942	279
Steam	12 153	8 822	3 331
Water	2 183	2 914	731
TOTAL UTILITIES	38 557	35 678	2 879
SUNDRY OPERATING PARTS	65 987	47 404	18 583
MISCELLANEOUS SUPPLIES USED IN PROCESS	44 003	47 904	3 901
REFRACTORIES	903	439	464
LUBRICANTS	3 311	2 544	767
PACKAGING AND SHIPPING SUPPLIES	198	555	357
OPERATING AND SERVICE TOOLS	8 288	13 790	5 502
ALL OTHER SUPPLIES	3 249	3 760	511
TOTAL TOOLS AND OPERATING SUPPLIES	125 939	116 396	9 543
EQUIPMENT INSPECTION SERVICE	6 425	6 288	137
TRANSPORTATION SERVICE	499	517	18
RELOCATING AND REARRANGING SERVICE	9 155	10 309	1 154
ALL OTHER SERVICES	15 572	18 237	2 665
MISCELLANEOUS SCRAP RECOVERED	30	258	228
GENERAL MILL OVERHEAD CHARGED TO INVENTORY COSTS			
TECHNICAL & WORKS ADMINISTRATIVE EXPENSE	64 689	65 579	890
ALL OTHER GENERAL PLANT EXPENSE	75	24	51
TOTAL COST ABOVE	449 996	463 804	13 808
TOTAL - MATERIAL & COST ABOVE	5 958 078	5 975 102	17 024

Italics denote red figures. In variance columns, red figures indicate unfavorable variances.

EXHIBIT 1

and dollars, while in the case of "cost above" (cost above materials), dollars only are exhibited. In the material section the budget for work done is computed by extending units produced by predetermined approved standard material allowances per unit of production and dollarizing the result at standard consumption prices. Quantities of materials actually used in process as well as actual quantities of scrap and secondary products, are evaluated at the same standard prices. The difference between the work done budget allowance for each type of expense and the actual at standard is reflected and detailed in the final column, "usage variance." In the example shown on the exhibit, it is indicated that 144 tons of materials in excess of the budget allowance were used, such excess being recovered in scrap rather than in primary product and, as a result of this off-standard yield performance, a dollar loss amounting to $3,216 was experienced.

Costs Above Material Cost

With reference to the "cost above" section of the exhibit, the dollar allowances for each element are budgeted under approved budget determinants. The determinants may be expressed in terms of earned operating hours, tons of prime product, occurrences or, for certain items of expense, a fixed amount on a calendar month basis. The dollar rates established for the budget determinants are applied to the respective budget determinant actuating quantities and recapped on a special form to arrive at the work done budget for each element of expense.

Operating labor is usually budgeted on the basis of earned operating machine hours, the allowed basic man hours being dollarized at established labor rates, while the actual at standard represents the actual man hours used extended by these rates. The difference between the two is usage variance and can be attributed to machine performance or nonstandard use of labor. As a rule, labor standards are in sufficient detail to give proper recognition to variable operating conditions, such crew size required in order to properly and efficiently man the unit. As an example, on certain of the units processing sheets, a four-man crew is allowed for sheets up to a specified sheet weight, while on sheets which are larger and heavier a standard crew of five men is allowed.

Repair and maintenance, which represents a substantial amount of money in a finishing mill such as Irvin Works, is a type of "cost above" expense which cannot be accurately judged on a

monthly basis. Of necessity, repair and maintenance standards, both labor and material, must be based upon normal expectancy over a long period of time. Nonrecurring items of unusual repairs may occur within any month, resulting in a poor cost performance for that month. Likewise, the lack of a normal amount of repairs may result in a favorable variance of unusual size. For these reasons, the total budget and actual expense for each element of repair and maintenance expense for the previous twelve months is shown on the statement. A very complete detailed analysis, accompanied by statistical data, is prepared and furnished to operating management in order that this expense may be properly controlled. Budget for work done and actual at standard quantities for labor and material are, of course, dollarized at the same dollar rates with the result that true usage variances are reflected.

Under the caption "Fuel," budget allowances are so established as to give proper recognition to source of supply, type of fuel available, and quantities required to produce the desired results at standard efficiency. Actual quantities of the various kinds of fuels used are charged to cost at standard prices, the difference resulting in usage variance. It is a relatively simple task to determine the variance resulting from off-standard fuel efficiency, boiler or furnace efficiency, and also variance resulting from good or poor cost control.

Utilities, which include electricity, steam, and water, are items of expense the use of which is widely influenced by product mix, this being particularly true in a highly mechanized mill such as Irvin Works. At this plant, there are modern high-speed cold reduction mills which use tremendous amounts of electricity for power. It can be readily realized that wide fluctuations in power requirements for mills of this type occur due to the many different thicknesses and widths processed. A similar situation to a lesser degree exists in regard to steam and water. The budget allowances for these elements of expense give proper recognition to these variables. The remaining items of "cost above" expense, as shown on the cost center statement; namely, tools, operating supplies, services, and technical and works administrative expense are handled in a manner similar to the items previously discussed. Proper budget allowances are provided under suitable determinants for comparison with the actual usage at standard expenditure rates for these items of cost.

Getting Down to Causes of Variances

It is apparent from the cost center statement as a whole, that, to get a complete analysis of cost results, a considerable amount of additional operating and statistical information must of necessity be furnished. However, the cost center statement gives an excellent method of placing a finger quickly on the spot of unusual cost performance, good or bad. For example, if a cost center statement is showing a high red variance in the material section, it is indicative that some place in the operations represented by the statement, product is being spoiled in greater quantity than considered standard. To get to the actual cause means that you probably have to go to statistical yield or scrap performance by units. However, such detailed information is readily available from the data used in the original assembly of the costs. It is apparent that the further down the line of responsibility you go, the back-up information necessary in order to analyze the causes of variance becomes more and more detailed. In other words, in looking at the total plant responsibility statements, we deal with fairly general reasons and discuss only major causes of variances, whereas when we reach the departmental level, we begin to deal with more detail as to cause of variances and at the general foreman level, the reasons for variances are analyzed in great detail.

Again, take operating and service labor as an example. If this item shows a red variance, it is indicative of one of two things. Either the output of equipment has been below normal, resulting in a high labor cost per unit produced even though the labor cost per hour may not have been excessive, or it could be that with good equipment performance, the labor cost was high due to excessive or careless use of labor. Once more, from the back-up reports, we are able to find whether the labor performance variance is the result of equipment performance or labor usage and what particular units are responsible for the variance.

What Must Be Controlled?

A number of references have been made to the necessity of going to statistical data or back-up papers for the analysis of basic or detailed causes of variance. This may give the impression that the cost center statements are inadequate. On the contrary, no piece of paper in itself can produce good costs. A cost statement at its best can only indicate to the operator where he must look for

improvement. In the steel business, or perhaps any business for that matter, there are only four major elements in the control of operating costs.

1. *Yield.* The amount of prime product produced from a given amount of materials.
2. *Labor usage.* The number of man hours used in the production of a given unit of product.
3. *Production rates.* The tons or other units of production turned out per hour on any given piece of equipment. This is particularly important on high investment equipment.
4. *Other material usage.* The control of repair and maintenance materials, utilities, fuels, etc.

If these four factors are properly controlled, good costs are automatic and what have been referred to as statistical data is simply detailed information in connection with these elements. All of the information necessary to control these elements satisfactorily is available through standard costs, but not all of it shows on the cost center statement.

Prerequisites and Advantages of Standard Costs for Control

It may be well to mention, too, that good standards are necessary if there is to be a standard cost system worthy of the name and if the effective control possible is to be in fact realized. Some of the prerequisites of successful control under standard costs are:

1. The standards must be realistic and accurate. Furthermore, there must be sufficient breakdown of standards to cover all expected variations in product, materials, etc.
2. The operating organization must be so designed that cost responsibility for a given area can be definitely placed upon individuals without a question of overlapping responsibility or authority. Such organization has always been considered desirable regardless of the cost system. However, under standard cost, it is essential.
3. Standards must be revised frequently enough to be representative of the current conditions. Otherwise, it is impossible to get operating heads to take responsibility for variances.

4. In the original assembly of the costs, there must be sufficient detail by units so that all necessary back-up information can be furnished for the analysis of causes of any particular variance.

Given these desirable features, it has been our experience that standard costs have the following advantages from an operating control standpoint:

1. They have eliminated the problem of product mix and its effect on cost.
2. They have placed cost responsibility directly upon specific persons in complete accordance with the manner in which the organization is intended to function.
3. They have yielded a dollar value for each detailed element of cost performance. This is of considerable importance for all too frequently in the past, hours were spent discussing poor performance where very few dollars were represented and other, apparently small, changes in performance were neglected because the dollar importance had not been emphasized. Our system permits spending time on the control of the cost items in respect of which dollars can be saved.

COMING ARTICLE

In the *N. A. C. A. Bulletin*, January 15, 1949

Predetermined Payroll for Efficient Labor Accounting and Cost Control

by S. B. Kingham and T. E. Hauser

GRAPHICAL REPORTING OF OPERATING VARIANCES AND RATIO DATA

by C. W. BENDEL,
Chief Cost Accountant, New Holland Machine Division, Sperry Corp., New Holland, Pa.

COST variance reports are frequently simple tabulations of lists of part number, description, standard cost of the item, the actual acquisition or other cost, and the variance. The reports may be accurate and may tell the story of what has happened during the particular period. Unfortunately for the cost department which has prepared a report of this kind, management often is too busy to sit down and analyze it. The value of a report is considerably increased if the executive can glean the details necessary for decisions in the minimum of time. The cost accounting staff of the New Holland Machine Division of The Sperry Corporation has endeavored to design a variance reporting system which will conform to this concept of a good cost variance report.

The material used in production has been grouped according to importance. Labor and overhead are reported departmentally. Other costs are arranged by expense classification. The reports feature graphs depicting significant variance percentages or other ratio data and are built around tabular presentations for the current month and year to date. The variance reporting forms and the methods used for determining variances are described in the following paragraphs.

Contents of Report to Management

A report is submitted to management each month containing ten schedules, of which the first (Exhibit 1) is basic to the six variance schedules which follow it in the listing below. Two contain expense ratio data and one is devoted to raw material and purchased parts inventories. The variance schedules are exemplified by Exhibit 2 and the ratio schedules by Exhibit 3. The inventory schedule as it applies to raw materials is shown as Exhibit 4. The full set of schedules may be identified individually as follows:

1. *Trencher Equivalents Produced.* Designed to show the trencher production for the foundry, machine shop, press room, welding department, and assembly departments.

2. *Analysis of Variances in Raw Material—Steel.* Designed to report on variances pertaining to raw materials used in the product: hot rolled bar and strip, cold rolled and tool steel; tees, angles, and channels; sheet steel: hot rolled and cold rolled; and tubing.
3. *Analysis of Variances in Foundry Materials.* Covers variances in foundry materials required in production, such as pig iron, gray iron scrap, gray iron remelt, briquettes, and other material.
4. *Analysis of Variances in Purchased Parts.* Designed for reporting variances in cost of power units, finished parts, semifinished parts, hardware and paint, and rubber products.
5. *Analysis of Variances—Direct Labor.* Departmental analysis of labor variances for foundry, machine shop, press room, welding department, and assembly department.
6. *Analysis of Variances—Overhead.* Covers the same departments as the direct labor variance report.
7. *Analysis of Variances—Other Costs.* Designed for covering variances in shipping department expense, selling expense, cash discounts, and administrative expense.
8. *Analysis of Overhead—Ratio to Direct Labor.* Designed for reporting details of overhead costs (indirect labor, supervision, overtime, vacation pay, and Christmas bonus, supplies and expense, and redistributed expenses) incurred by the foundry, machine shop, press room, welding department, and assembly department.
9. *Analysis of Selling Expense—Ratio to Factory Cost.* Designed for analyzing the components of selling expense such as supplies and expense, traveling and entertainment, office salaries, commissions, salesman's bonus, telephone and telegraph, redistributed expense, customer service, and advertising.
10. *Inventories.* Designed for reporting on raw materials inventories and purchased parts inventories. In one section are covered hot rolled bars and strip, cold rolled and tool steel, tees, angles and channels, sheet—hot and cold rolled, and tubing. In the other section are covered power units, finished parts, semifinished parts, hardware and paint, and rubber products.

TRENCHER PRODUCTION

Month of July 1948 (All Data Hypothetical)

Department	Standard D. L. Cost Per Unit	Standard Direct Labor for Month	Production	
			Month	Yr to Date
Foundry	$ 15.9211	$ 7,519	472	3250
Machine Shop	20.4297	12,442	609	3170
Press Room	12.3154	5,988	486	3390
Welding Dept.	10.9751	5,058	461	3480
Assembly Dept.	18.8421	9,412	500	3576
Total	78.4834	40,419	515	3420

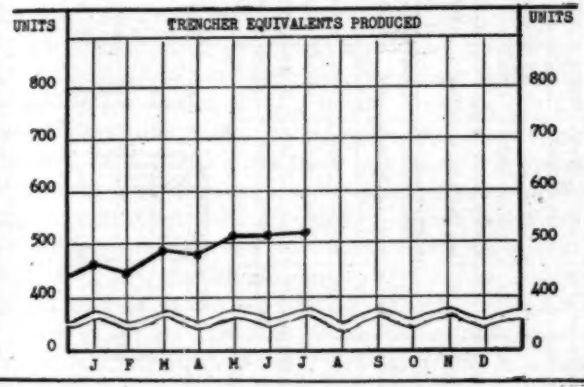

EXHIBIT 1

Each schedule consists of the tabulation section or sections and the chart section. New tabulation sections are prepared each month. The chart section is kept up to date by plotting the applicable data from the tabulations for each month on a yearly master chart. The final form of each schedule, as submitted to management, consists of a photostat, with the tabulation section superimposed on the master chart.

The year-to-date portion of the tabulation section in each chart falls in with the lines and columns of the current month portion. Year-to-date amounts are obtained by adding the values in the year-to-date section of the previous month's report to those which have been accumulated for the current month. The chart sections of the variance schedules, as exemplified in Exhibit 2 and of the ratio schedules as exemplified in Exhibit 3, plot percentage

ANALYSIS OF VARIANCES

Month of July 1948 — TRACTOR INSTALLATION PROGRAM 515 — (All Data Hypothetical)

RAW MATERIAL - STEEL	Standard Costs: Per Unit	Standard Costs: Required Applicable	Standard Costs: Charged Applied	Actual Cost Charged Acquired	Inventory Variation: Amount	Inventory Variation: Per cent	Cost Variance: Amount	Cost Variance: Per cent	Analysis of Cost Variance: Uncontrollable: Amount	Uncontrollable: Per cent	Controllable: Amount	Controllable: Per cent
Hot Rolled, Bars and Strip	$11.8747	$ 6,115	$ 9,429	$10,681	$ 3,314	154.2	$ 1,254	113.3	$217	2.3	$1,037	11.0
Cold Rolled and Tool Steel	8.4444	4,349	4,592	5,183	243	105.6	551	112.0	23	.5	528	11.5
Shps, Angles, Channels	27.3145	14,067	18,417	18,914	4,350	130.9	497	102.7	18	.1	479	2.6
Sheet - Hot or Cold Rolled	14.0670	7,245	10,482	17,893	3,237	144.7	7,411	170.7	347	3.3	7,064	67.4
Tubing	6.8432	3,525	4,009	4,935	484	113.7	926	123.1	16	.4	910	22.7
TOTAL	$68.5848	$35,301	$46,929	$57,568	$21,628	132.9	$10,639	128.8	$643	1.5	$9,996	21.1

January 1 to July 31, 1948 — TRACTOR INSTALLATION PROGRAM 3420

RAW MATERIAL - STEEL	Standard Costs: Per Unit	Standard Costs: Required Applicable	Standard Costs: Charged Applied	Actual Cost Charged Acquired	Inventory Variation: Amount	Inventory Variation: Per cent	Cost Variance: Amount	Cost Variance: Per cent	Analysis of Cost Variance: Uncontrollable: Amount	Uncontrollable: Per cent	Controllable: Amount	Controllable: Per cent
Hot Rolled, Bars and Strip	XXXX	$ 40,611	$ 69,402	$103,756	$ 28,791	170.9	$ 34,354	149.5	$ 4,512	6.5	$ 29,842	43.0
Cold Rolled and Tool Steel	XXXX	28,880	31,872	36,334	2,992	110.4	4,462	114.0	477	1.5	3,985	12.5
Shps, Angles, Channels	XXXX	93,416	130,942	191,681	37,526	150.9	50,739	136.0	6,906	4.9	43,833	31.1
Sheet - Hot or Cold Rolled	XXXX	48,109	83,492	145,276	35,383	173.5	61,784	174.6	19,287	23.1	42,497	50.9
Tubing	XXXX	23,807	30,801	40,737	6,994	129.9	10,336	134.0	517	1.7	9,819	32.3
TOTAL	XXXX	$238,823	$356,109	$517,784	$121,686	151.9	$161,675	145.4	$31,699	8.9	$129,976	36.5

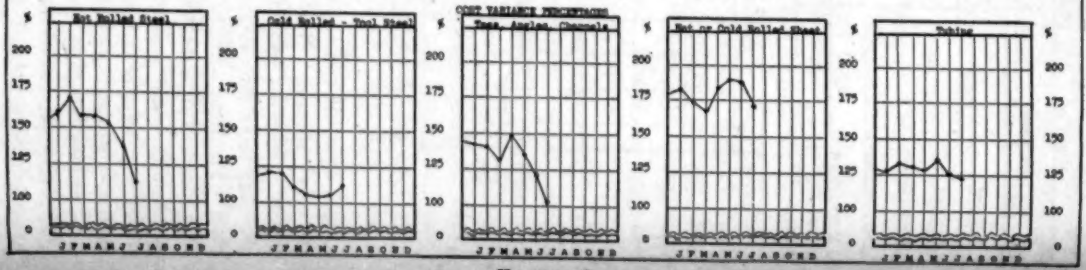

EXHIBIT 2

data developed in the tabulation sections. The chart sections of the trencher production schedule (Exhibit 1), and of the inventory schedule (Exhibit 4), plot trencher unit equivalents produced or in inventory, respectively.

There are also a few additional schedules included in the report each month in respect of performance on detailed product items (Exhibit 5) which the cost department may wish to call to the attention of management. Their number and contents depend upon conditions. These schedules, as issued, supplement those enumerated above.

Variance Reporting

Our reports provide, in effect, for simultaneous recognition of change in volume of inventories at standard costs and of variances resulting from purchases and processing for the month, designated as cost variances. The key to this is Exhibit 1 which displays the month's production equivalent in trencher units as the quotient of standard direct labor cost charged to operations, (this standard cost has been adjusted for changes in production operations or in subcontracting of parts or operations) divided by standard direct labor cost per unit. Incidentally, the graphic representation of this production equivalent for the various months of the year to date, shown at the bottom of Exhibit 1, is a helpful first picture to present to management in the month's report.

The production equivalent of 515 shown assists in setting up Exhibit 1, the raw steel variance schedule. Other variance schedules are constructed on the same principle. The standard unit cost of each type of material as displayed in the first column, multiplied by 515, yields the second column or the standard dollar amount applicable to the month's production. The difference between this column and the next one, which shows amounts provided by the tabulating department for the standard cost of material in these classifications (1) purchased and (2) charged to production, accounts for the variation (increase) in these inventories at standard costs during the month and will be found so headed in the center of Exhibit 2.

A forward reference to Exhibit 4 will disclose that the dollar amounts for this change are carried to the inventory schedule as the bridge between opening and closing balances.

We are now ready to handle the cost variances for the month for the purposes of Exhibit 2. The third and last standard cost

column, designated "charge applied," represents, in accordance with considerations which have already been given, the standard cost of applicable materials purchased or used during the month. Comparison of this column with the adjoining actual cost column, also provided by the tabulating department from the month's transactions, gives the composite cost variance. This may be made up of factors of price, labor rate, usage, volume, or other type of variance and its segregation into controllable and uncontrollable elements is accomplished in the remainder of the schedule.

Controllable and Uncontrollable Cost Variances

There is a fair amount of underlying work required for this segregation. In general, the procedure is to determine the amount of uncontrollable variances and to deduct these from the cost variance amount for the item in question to obtain the amount for the controllable variance column.

The values for uncontrollable variance amounts are obtained from the following sources, depending on the variance schedule in preparation:

1. *Materials.* The purchasing department keeps the cost section informed of changes in mill prices and other cost changes over which they have no control. The detailed tabulating report of materials acquired is checked for items of this kind. The quantity acquired is multiplied by the difference between the basic standard price and the current standard price to obtain the uncontrollable variance value.
2. *Labor.* The actual direct labor hours reported for the month are multiplied by the increased labor cost per hour.
3. *Overhead and Other Costs.* Actual uncontrollable overhead reported minus the standard uncontrollable overhead allowance (trencher equivalents multiplied by standard uncontrollable overhead allowance per unit).

The uncontrollable portion of a material price variance is determined as the difference between the standard price which was used at the time the standards were set and the current standard price of the material. General wage increases or other changes in the base rates constitute the uncontrollable labor variance. Redistributed expenses and similar elements of overhead constitute

the uncontrollable overhead variance. Shipping, selling, and administrative expenses also include redistributed expenses which are uncontrollable elements. For this purpose, cash discounts and royalties are considered entirely uncontrollable.

The controllable elements of the price variances will include variances created by changes in price due to change of supplier, emergency purchases of less than standard quantities, etc. Controllable labor variance includes increased bonus earnings, increased labor costs due to merit wage increases, changes in production methods, changes to standard time allowances, etc. Overhead variances considered controllable are charges for departmental indirect labor, foreman and supervisor wages, overtime premium, small tools, supplies and expense. The controllable

ANALYSIS OF SELLING EXPENSE—RATIO TO FACTORY COST

All data hypothetical

Month of July 1948	*Current month*		*Year to date*	
Units sold	400	xxxx	3,200	xxxx
Factory cost	$260,000	xxxx	$2,080,000	xxxx
Kind of expense	*Amount*	*Per cent*	*Amount*	*Per cent*
Supplies and expense	$ 1,300	.50	$ 9,438	.45
Traveling and entertainment	5,460	2.10	42,770	2.06
Customer's service	1,872	.72	14,658	.70
*Commission	5,304	2.04	45,683	2.20
*Salesman's bonus	1,846	.71	13,855	.67
*Telephone and telegraph	1,300	.50	9,839	.47
*Advertising	6,292	2.42	47,590	2.29
*Salaries, office	7,462	2.87	54,818	2.63
*Redistributed expense	8,918	3.43	68,674	3.30
Total	$ 39,754	15.29	$ 307,325	14.77

*Grids for these items omitted from exhibit.

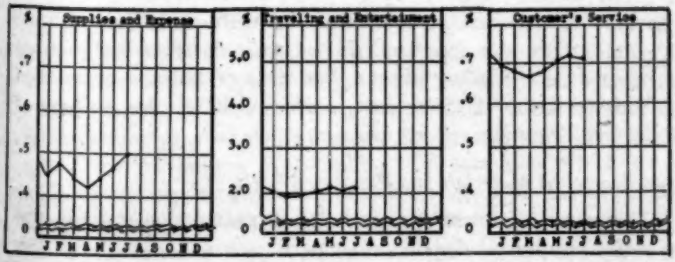

EXHIBIT 3

element of shipping, selling, and administrative expenses includes departmental labor, supplies and expense, traveling and entertainment expenses, office salaries, commission, salesmen's bonus, telephone and telegraph expenses, customer service expense, and advertising.

The Ratio Schedules

The two ratio schedules listed earlier in the article concern overhead and selling expense and, as also noted earlier, the latter is illustrated by Exhibit 3. These are ratio schedules, as distinguished from variance schedules, in that they relate actual expenditure to a base with which it may be expected to show general correlation rather than to a predetermined amount for the outlay. The base used for overhead is standard direct labor. Factory cost serves as the base for selling expense. Each schedule carries a current month, year-to-date, and chart section as with the variance schedules.

The overhead ratio schedule runs to greater length than the other schedules because expense classifications are detailed departmentally. These classifications include indirect labor, supervision, overtime, vacation pay, Christmas bonus accruals, direct expense, and redistributed expense—all as prepared by the tabulating department after each month's run of operating data. The percentage column, relating the total of each expense category to standard direct labor dollars for the month, is reflected in the chart section by a separate grid for each item, traversing the months of the year.

It is somewhat similar with selling expenses, as a glance at Exhibit 3 will show, except that departmental detail is not involved and the ratio computations strike off the behavior of this class of expense against factory cost. The tabulation section of the schedule is particularly compact. As with the overhead ratio schedule, there is a separate grid for each classification, showing in what measure selling expense has risen or fallen in proportion to factory costs. Factory cost is arrived at for this purpose as units sold times factory cost per unit.

Inventories of Materials and Purchased Parts

The report of inventories includes two tabulation sections, raw material section and purchased parts section. Only the raw material section is illustrated in Exhibit 4. However, both tables

INVENTORIES

All data hypothetical

Raw Materials

Kind of material	*Beginning of month*	*Increase or decrease*	*End of month*	*Trencher equivalents*
Hot rolled, bars and strip..	$28,372	$3,314	$31,686	2668
Cold rolled and tool steel..	20,482	243	20,725	2454
Tees, angles, channels.....	88,889	4,350	93,239	3414
*Sheet steel	54,821	3,237	58,058	4127
*Steel tubing	18,942	484	18,976	2273

*Grids for these items omitted from exhibit.

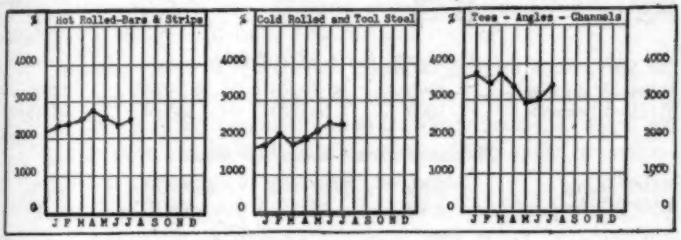

EXHIBIT 4

carry opening and closing dollar balances at standard costs, reconciled through the net change figures afforded by the inventory variation column of Exhibit 2. In addition they contain a conversion of the closing inventory for the month to quantities in terms of trencher equivalents. The chart section reflects the quantity data in separate grids for each inventory classification. The graphs serve to depict inventory fluctuations as well as quantity on hand in terms of trencher equivalents.

Ready and Significant Information

There will always be detailed items showing unusual and adverse cost variances. Some of these will affect totals and percentages and thus provoke inquiry. Others will not and might therefore escape notice. It helps to have items of this kind spotted in advance, so far as possible, and drawn to the attention of management. In the course of compiling the schedules which go to make up the report which has been the subject of this article, we try to pick up items which will benefit from such attention. They are disclosed in a supplementary schedule, exemplified in Exhibit 5.

SUPPLEMENTARY REPORT OF RAW MATERIAL VARIANCES
MATERIAL PURCHASED DURING JULY, 1948

Item	Quantity	Standard value	Actual cost	Variance percentage
Raw Material—Hot Rolled Bars and Strip				
1 x ¼ HR Bars	3000#	$ 120.00	$ 300.00	250%
2 x ¾ HR Bars	5000#	220.00	350.00	159%
4 x ⅛ HR Strip	10000#	360.00	480.00	133%
Raw Material—Hot or Cold Rolled Sheet				
10 ga. Sheet—HR	25000#	$1000.00	$2500.00	250%
16 ga. Sheet—HR	16000#	540.00	1120.00	207%
20 ga. Sheet—HR	10000#	450.00	900.00	200%
Purchased Parts—Semifinished				
10184—Main Gear	1000	$ 250.00	$ 350.00	140%
01181—Flywheel	1800	1800.00	2600.00	144%
Purchased Parts—Rubber Products				
00999—Tires	3000	$45000.00	$60000.00	133%
01000—Tubes	2400	4800.00	6000.00	125%

EXHIBIT 5

The graphic presentation of percentages and ratios is a boon to the busy executive and the time required for perusal of standards data is considerably reduced. The accumulation of the detailed data is a negligible operation due to the use of mechanical tabulating machines.

Top management receives a complete variance report. Copies of material variance reports are delivered to the purchasing department. Labor and overhead reports are submitted to the plant superintendent. Analysis of selling expense is given to the sales manager and the inventory report is directed to the attention of the head of production control and inventories section. This type of variance and ratio data reporting has been found to be very satisfactory and is a desirable and necessary part of a standard cost system.

KEYING THE SALES BUDGET TO CUSTOMER BUYING NEEDS

by D. E. MERRIFIELD,
Cost Accountant and Industrial Engineer,
The Specialty Papers Co.,
Dayton, Ohio.

AN effective hold can be had on sales effort through the sales budget. The procedure for sales budgeting here presented has been devised with all of the usual problems of selling goods kept in mind but, more specifically, it stresses the point of seeking out those customers who will buy our goods at a rate that will be to our mutual advantage. To carry this thought further:

1. We desire to sell enough goods in such a manner that we can maintain our plant on a near capacity load.
2. We desire to maintain good customer relations, which we believe can be done if we are allowed to assist in arranging shipments in an orderly sequence.
3. We believe that the two goals mentioned first will aid us materially in making the sum total of all our business more profitable so that, in the final analysis, lower prices may be enjoyed by all customers.

To give effect to the proper balance among the above considerations requires a good deal of sales effort and planning. They represent broad selling functions which, in daily action, are the outward manifestations of a sales policy. An effective approach to the solution of the problem of making the policy a reality is to be found in the use of a sales budget plan that goes hand in hand with sales effort and reveals, in an orderly manner and in advance, the buying situation of each customer.

We are waxed paper converters currently producing fifty million pounds per year. We do not make the paper but buy it from some twenty paper mills. The paper is bought on specifications for kind, texture, and color to make the 250 or more grades which we offer to the trade as our product. Special grades are required for limited uses, but for the most part we adhere to the standard grades. However, due to the numerous special demands from the customers, transactions must be handled on an order-by-order basis.

Initial Sales Classification and Analysis

There is a far-reaching demand for waxed paper, and the uses are wide and include many basic industries. However, to sell this

highly diversified product to near plant capacity requires a continuing sales study of broad scope. In solving this problem in our company, the preliminary groundwork began with setting up ten major classifications under which all of our 250 grades could logically be grouped. By the mere fact of using such a breakdown, the extreme bulkiness of the project was materially reduced. The breakdown into these major classifications was facilitated by the fact that all grades have family designations and these designations are such that the end use of the product by industry is indicated in most cases. Having this separation available has made it possible to establish a correlation of our sales plans, with the business trends in the various industry lines as reported by nation-wide services. We do not rely disproportionately on any source for these trends but all such matter received is promptly taken note of and given consideration in our plans, on a day-to-day basis, largely by the director of sales and his immediate staff.

What the classifications, themselves, afford by way of an approach to planning of sales efforts by industries by customers is apparent from the following brief descriptions:

1. *Various Printed Grades.* This group may contain any grade from among the other classifications, if printed.
2. *Breadwrappers.* Always printed but serves one industry.
3. *Dry Waxed Grades.* Tobacco mechanical, and textiles.
4. *Drinking Cup Stock Grades.* Drinking cups, souffle cups, and doilies.
5. *Laminated Grades.* Generally restricted to ready-mixed foods.
6. *Transparent Grades.* Fancy display package for tobacco and food.
7. *Wet Waxed Grades.* Foods that are packaged and sealed by wrapping machines and other volume uses.
8. *Semidry Waxed Grades.* Tobacco packaging.
9. *One Side Waxed Grades.* Locker and deep freeze purpose, foil mounting, soap, and mechanical.
10. *Sheets.* Any grade from the eight other classifications produced in sheets (other classifications are in rolls).

The ten major classifications above cover 98 per cent of sales volume and may be considered complete coverage for practical pur-

poses. Based on this segregation the sales budget planning proceeded with a sales analysis for a selected, recent year. All sales were broken down among the ten classifications. But this was only a starter. Each classification was broken down by grade, month, and tonnage, and, further, to customers by month and tonnage. This analysis was accomplished rapidly by use of unit sales ticket runups summarized on work sheets.

Working Up to the Objective of Sales Budgeting

The completed analysis provided a basis for the director of sales and his staff to set up the budget for the first year. It became readily apparent which grades were low in tonnage and which were spotty as to monthly sales on a tonnage basis. The analysis also revealed how often each customer was buying and the grade and tonnage required. In formulating the budget from such indications, the problem became one of making a survey of the possibilities inherent in the individual grades. Among some of the considerations was the ability to get sufficient paper to carry out the projected quota, the machine capacity to process the quota, and the possibility of changes which might curtail use of the product.

Out of this stage of planning, the company's objective was established. This objective was finally beamed at each customer and prospective customer with the thought in mind of evaluating his yearly and monthly rate of usage. Thus, in the final stage, the budget represented a whole series of customer studies which established the quota or budget for each grade of our line. In this connection, it is well to consider that in formulating a budget a game is being played in which the factor of chance is present. However, when a thorough study has been made of a generous number of items and there has been careful evaluation, the chances are definitely on the winning side. While the budget is in course of compilation, it is quite likely that in some instances it will not be possible to provide prospective sales up to the quota desired for certain months. In such cases it is a good plan to fill in to the required quota and indicate that, as these periods are approached, extra sales effort will be needed.

An Innovation: The "Sales Station" Technique

With the budget in hand, things did not happen thereafter just because a plan had been set up. We still had to work over it and

blow breath into it to keep it alive. There is much to do every day throughout the year. No budget can be wound up tight enough to keep a factory running. However, we did adopt, after success with our customer studies, what we have found to be both a sound and practical concept of sales budgeting. To us, a sales budget is a means of telling your salesmen where to go before they tell you they have gone. To effect this, our plan provided for a withdrawal of a certain number of salesmen from circulation and their assignment to a prescribed number of "selling stations" located in the general offices, each covering one or more major classification.

By advanced training, salesmen were selected to head these stations as sales station managers. The training stressed a high degree of specialization to cover the products assigned, and provided a good foundation of technique in gaining and holding customers through good customer relations. These men work at the customer level and the pay-off is a constantly strengthened budget with all that it implies. The station manager works in an unlimited territory but travel is reduced to a minimum by short and well-directed trips for customer contact. The primary purpose of the stations, of course, is to provide direct control over the allotted grades in such detail that each grade is moving into the customer's hand in close relation to the budget. Failure to meet the budget in any grade soon becomes known to the director of sales.

Facilitating Production Control and Sales Effort

Production control relies very heavily on the sales budget. With this thought in mind, there has been incorporated in the over-all plan a schedule which shows continuously the potential demand for each and every specification of paper. In addition, the quantity of direct materials and machine hours required for processing are set up. Since, in many instances, we have to provide our suppliers with our requirements two months in advance of our conversion date, this information furnishes a much-needed guide.

The sales budget plan of our company as it has been outlined here affords a vast storehouse of possibilities awaiting to be applied to many lines of business, particularly from the viewpoint of a customer relations program. If a company can, at one and the same time, both set and even its production schedules and also draw closer to the problems of supply which are weighing upon its customers, a very worth-while step for the business as a whole has been taken.

PUBLIC WAREHOUSING OF PRODUCT UNDER MANUFACTURING DEPARTMENT CONTROL

by RICHARD J. HALLORAN,
Assistant to the Controller, York Corp.,
York, Pa.

WE are engaged in the manufacture of air conditioning and refrigeration equipment, frozen food cabinets, and allied products, most of which are more or less seasonal as far as sales are concerned. In order to provide space for the excess of production over sales during the slack selling seasons, to reduce transportation costs to our customers who are on an f.o.b. basis, and to reduce delivery time to them, our company adopted, early in 1948, a policy of warehousing a large portion of finished goods inventory in public warehouses at various points throughout the country. The purpose of this paper is to describe the program as a whole and the accounting and paper work procedures devised for it.

Improved Production Scheduling and Customer Service

The disposal of excess production thus effected gives the factory an opportunity to manufacture on a program basis with consequent longer runs and lower costs. The elimination of the necessity of bringing a large number of products with identical selling seasons into the finished product stage at the same time relieves congestion, promotes better meeting of schedules, and in general encourages a better controlled and more economical operation.

Benefits also accrue to customers. The policy calls for shipment to public warehouses in carload lots only and reshipment from the warehouses according to customers' orders which, generally, are in less than carload quantities. We selected warehouses in large cities so located that the great majority of our customers realize substantial monetary savings from the combination of carload freight rates from the factory to the warehouse plus l.c.l. rates from the warehouse to them, as compared to l.c.l. rates all the way. The location of the warehouses is such that time consumed en route from them to the customer is materially reduced in comparison with that involved in shipment from the factory.

Selection of Warehouses

Warehouses selected were in every case well equipped, financially stable organizations with experience in handling a variety

of products for clients with particular needs. A strict requirement, from the accounting department standpoint, was that facilities be provided for handling paper work in the form of bills of lading, sight drafts, invoice copies, inventory lists, etc. We found that the better equipped warehouses were quite capable of performing almost any operation of a clerical nature as well as all the normal functions of receiving, handling, storing, and shipping. However, in order to render a contribution to the program by keeping the clerical expense at a minimum, we devised our procedures so that the warehouses were asked to perform a minimum of the clerical work. As one of the warehouse managers told us, "a good public warehouse will perform any function you ask for and will perform it well, but we charge you for everything we do."

From an organizational standpoint, the operation of the public warehousing program was placed under our manufacturing division rather than under the sales organization. The primary reason for this decision was the objective of keeping the production lines clear of finished stock problems. Decisions to fill orders from warehouse or factory stock are strictly in the province of the manufacturing staff.

Warehouses are selected by the manufacturing division after recommendations from the sales division as to geographical location and are jointly approved by the manufacturing, sales, and controller's divisions. Decisions as to original, additional, or changed locations are based on the following factors:

1. Need for additional space over that available in current locations.
2. Shorter delivery time to surrounding territories.
3. Desirability of water, or part water, shipment to some locations.
4. Atmospheric conditions affecting our products.
5. Shifts in, or new facts relative to, the concentration of sales potential.
6. More favorable storage rates available in other locations.
7. More favorable state tax rates available in other locations.
8. More favorable transportation costs to other locations.
9. Physical facilities available.
10. Financial condition.
11. Clerical facilities available.
12. Acceptability from an insurance standpoint.

Quotations on Products Included in the Program

Products stored in the warehouses are limited to those of a packaged nature which can be shipped to the warehouses in individual crates. They must have motors with conventional motor characteristics and in general be of such nature that the public warehouse personnel can identify them easily from crate markings when making shipment.

PRICE LISTING OF PRODUCTS SELECTED FOR WAREHOUSING

				F.O.B. Distributor Prices				
Commodity	*Model*	*Current*	*Wt.*	*York*	*Phila.*	*Atlanta*	*St. Louis*	*Oakland*
Frozen food cabs.	165	115-1-60	508	$xxx	$xxx	$xxx	$xxx	$xxx
	350	115-1-60	1010	xxx	xxx	xxx	xxx	xxx
	350	230-1-60	1010	xxx	xxx	xxx	xxx	xxx

EXHIBIT 1

Distributor prices for each product included in the program are published on an f.o.b. basis from the factory and from each of the warehouses. A portion of a page from the price list appears as in Exhibit 1. Each distributor is assigned to a warehouse and informed that his orders will be filled either from that warehouse or from the factory at the discretion of the company. In unusual cases he may receive a shipment from a warehouse other than his designated warehouse, due to availability of stock. In those instances he is protected against extra freight costs by a credit for the freight differential.

Stocking the Warehouses

The production control department determines which products are to be forwarded to public warehouses, through reviews of production schedules and current sales orders. Only the excess of production over orders calling for shipment in the near future is warehoused. Shipments to customers are made from production whenever there is a choice since this results in a double advantage. The factory areas are cleared immediately and a warehousing charge on those particular products is saved. In and out charges are already paid on the items in the warehouse and shipping from there in preference to shipment from production might result in eventual replacement and duplication of service charges. The determination of quantities to be shipped to particular warehouses is made upon consultation with the market research department

AUTHORIZED SHIPMENT BASIS

WAREHOUSE INSTRUCTIONS		
This order to be shipped as checked.		Open acct.
		S/D— B/L
		C.O.D.
Other instructions:		

EXHIBIT 2

where sales forecasts and other marketing tools are utilized. Products shipped to warehouses clear the factory on factory transfer orders with the freight charged to inventory.

We have not felt it necessary to segregate the value of inventory in the warehouses from other stock in our accounts. We feel that stock records, by warehouse, provide sufficient detail. If it should become necessary, we can establish a separate account for all warehouses or individual accounts for each warehouse and make a transfer of value each time a factory transfer order is completed.

Handling Distributors' Orders

The distributor's order is forwarded to the factory through the local sales office as in our standard procedure. The factory order department decides that the shipment should be made from a warehouse after reviewing the availability of stock at the factory and at the warehouse and space conditions at the factory. The order, showing the particular warehouse, is then forwarded to the billing department where it is priced and sent to the treasurer's department for credit approval. The treasurer's department decides whether the shipment will be made on an open account, c.o.d., or sight draft basis and indicates its decision on a special block which has been imprinted on order forms. This block is illustrated in Exhibit 2. Depending upon the block checked, the treasurer's department proceeds as follows:

Open account shipments. Three copies of the order are forwarded directly to the designated warehouse.

C.o.d. shipments. Treasurer's department contacts the billing department for a pro forma invoice and forwards it to the warehouse along with three copies of the order.

Sight draft shipments. Treasurer's department contacts the billing department for a pro forma invoice and prepares the sight draft, a letter to the customer's bank, and the bill of lading on which it secures endorsement. All of these papers are forwarded to the warehouse along with three copies of the order.

Upon receipt of the papers, the public warehouse performs these operations:

1. Posts serial numbers and weights to the order copies.
2. Attaches one copy of the order to the shipment as a packing slip.
3. Prepares bills of lading for open account and c.o.d. shipments or completes sight draft bills of lading by adding serial numbers and weights.
4. Forwards sight drafts, letters, and pro forma invoices to banks and customers.
5. Makes shipments.
6. Retains a copy of each order for its records.
7. Returns a copy of each order and two copies of each bill of lading to the order department at the factory.

C.o.d. shipments list our company as the payee and funds collected are forwarded directly to our office by the carriers. We do not ask the public warehouses to make any collections or handle any funds.

Upon receipt of order copies evidencing shipment from a warehouse, the order department posts the shipments to stock record cards and forwards the order copies to the billing department where invoices are completed and distributed in the same manner as for shipments from the factory, thus completing the full cycle of shipping and billing.

Warehousing and Freight Costs; Insurance Coverage

At the time this program was approved, our management made a decision to absorb the cost of receiving, storing, and shipping of our products by the public warehouses rather than to pass this expense along to our customers as a warehouse surcharge. Freight

to the warehouses is passed to the customers, as described above, by its inclusion in f.o.b. warehouse prices. Since carload shipments to the warehouses result in lower over-all freight costs, there is of course no objection raised to the inclusion of carload freight in the f.o.b. price.

We record invoices from the warehouses for handling and storage and any special charges for services in a special expense account, which enables us to keep up to date on the cost of the program. We can also determine the expenditure for any individual warehouse, by analysis, if requested. Should the requests become numerous, we can always provide subaccounts for each warehouse.

Freight to the warehouse is charged directly to inventory. We operate a standard cost system and when invoices for warehouse shipments are costed and inventory relieved, the cost includes an element for freight. The amount of this freight element is determined from prepared lists of the products which are warehoused, showing the amount of freight for each and based on the shipping weight and the carload freight rates per hundred pounds from the factory to the various warehouses. When physical inventories are priced, the total shipping weight in each warehouse is computed from prepared schedules by product and extended at the carload rate to the particular city. The resulting amount is added to the standard product value.

Once each month a listing of inventory is received from each warehouse. There is no charge made us for this service. These listings are reconciled with stock record cards, extended at selling prices, and forwarded to the insurance department for checking against coverage. In addition, copies of factory orders for shipments to the warehouses are received by the controller's department. These are extended at selling prices and the insurance department is thus given interim advice of sizeable changes in value at any location since the last monthly report.

A Smoothly Operating Procedure

To date the program is proceeding according to schedule and along the lines described herein. There has been no undue confusion. The mechanics as set up have proven themselves to be a simplified method of controlling shipments, credit, and paper work for a program involving locations and personnel independent of our organization.

COST ACCOUNTING FOR SERVICES—THE COMMERCIAL BANK'S COST PROBLEM

by ARNOLD J. RYDEN, JR.,
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AS in industry, the primary purpose of cost accounting in banks is to isolate managerial problems and to provide quantitative data to substantiate or refute existing opinions in regard to the solutions of these problems.

While the development and growth of cost accounting in banks has not been as extensive as in industry, a number of banks have used cost accounting techniques for many years and an increasing number are becoming aware of the need for and value of cost accounting data.

In pursuing the subject in this article the material is presented under the following headings: (1) the general objectives of cost accounting in banks, (2) an outline of the methods of accumulating cost data, and (3) managerial uses of cost data.

General Objectives

The major objectives of cost accounting likewise fall into three categories: (1) long-range policies, (2) control of operations, and (3) pricing.

Long-Range Policies

Just as manufacturers must make decisions as to which products should be emphasized and which should be curtailed, bankers must formulate policies which will produce the largest profit over the long run. Sometimes it is necessary for manufacturers to continue a product which is losing money in order to present a complete line. Similarly banks must continue to perform some services from which little or no revenue is received. However, with accurate cost data management can be kept aware of the costs of unprofitable services so that the proper balance may be maintained.

These points are rather well illustrated by the following section of a report submitted to the top management of one of the nation's leading banks:

> "The greater portion of our earnings arises from the medium- and large-sized accounts in each and every phase of our business yet every customer, irrespective of the size of his account, is a possible prospect for other types of banking busi-

ness and might be influential in attracting friends and acquaintances to the bank.

"The question then follows as to whether our advertising, new business effort, and operating policies are properly directed to produce a good balance between the factors of earnings and good public relations and to obtain the right proportion of all classes of business."

It is easy for the cost accountant in a bank as elsewhere to become bogged down in the voluminous detail which is such an important part of his work. But if he is to do a complete job, he too must realize that long-range plans as well as current operating practices should be based on realistic cost and profit data. On the other hand, it has happened many times that those responsible for accounting in banks have been discouraged from analyzing the costs of various functions because management has said "There is no point in going into that subject because our public relations policies require us to continue on our present basis."

Control of Operations

Measurement of the efficiency of the various operating units is the second major objective. Development of departmental and unit cost comparisons provides the stimulus for closer scrutiny of operating methods and procedures, which is the forerunner of greater operating efficiency. Here banks are at a disadvantage for several reasons. First of all, it is exteremely difficult to get realistic measures of activity (production). Rather than spinning so many pounds of yarn or assembling so many toasters, banks process a variety of pieces of paper in many different ways.

For example, the tellers receive deposits (some with cash, some without), cash checks (on this bank, other local banks, and out-of-town banks), cash savings bonds, prepare currency and coin for use in customers' payrolls, and do a variety of other tasks. The smaller the bank the larger variety of things one individual may do. Furthermore, banks cannot schedule their own production, except in a few departments. Rather, it is determined by the actions of the customers. For example, check cashing is greatest on Fridays and on the fifteenth and last days of each month. In the proof department, the activity is heavy on Mondays and the days after holidays. Comparisons are also difficult because most banks have retained the month as the accounting period, despite the variations in number of work days.

However, when cost accounting techniques are combined with other methods of production control, such as weekly comparisons of hours and production, considerable benefits may be derived. The mere existence of cost accounting in banks has created, I believe, a cost-consciousness among those responsible for the incurrence of expenses.

Pricing

Intelligent pricing requires, in addition to knowledge of demand and competition, an accurate understanding of the costs of the services to be priced. Prices of services in banks are considerably less easily related to cost than is the case with industrial products. The customer pays for many services simply by maintaining an adequate balance in his checking account. For other services, such as credit information, he generally pays nothing. Since many free services are regarded as public relations or business development, management should be made aware of their costs.

In the past many banks were satisfied if the charges for services equalled what the costs were thought to be. Income came largely from interest on loans, while other possible sources of income were neglected. Obviously, pricing of bank services should provide not merely for a recovery of costs, but also as large an element of profit as is consistent with the long-range development of the bank.

Accumulating Cost Data

With these objectives in mind, we can go on to review briefly the procedures involved in accumulating cost data. The bank functions may be grouped as (1) obtaining funds, (2) investing funds, and (3) other services.

Functional Grouping of Departments

Each of these functional groups includes several operating departments, all of which are benefitted by a host of service departments. The following is an outline of the principal departments in each of these groups:

Obtaining Funds. (Primarily in securing, servicing, and maintaining deposits.)

Major Departments	Supporting Departments	
Savings	Proof	New business
Bank deposit	Bookkeeping	Transit
Commercial checking	Exchange (on non-par checks)	Tellers
Capital funds	Analysis (service charge computation)	

Investing Funds. (Investing the funds provided by the departments listed above.)

Investment (in securities)	Installment loan (consumers)
Commercial loan (large businesses)	Mortgage loan (home owners)

Other Services:

Trust	Safe deposit
Collection (of drafts, coupons, etc.)	Bond trading

Each of the four last-mentioned departments obtains income directly for the services performed, and also provides services for the other two major groups. For example, the collection department provides some services for correspondent banks without charge (presumably to keep their deposits). Similarly the trust department may provide safekeeping services for correspondent banks, possibly without charge. The costs of these services must be regarded as part of the costs of obtaining funds from correspondent banks. Therefore, transfers of costs must be made to present the true profit pictures of the various functions. The bond trading department may perform a dual function—that of a trader in bonds and of investor of bank funds. Still other departments produce no income and may be designated as general service departments to the various operating departments. Such are:

Personnel	Auditing
Switchboard	General accounting
Purchasing	Central filing
Addressograph	Guards and floormen
Mimeograph	Mailing
Stenographic	

Accrual, Allocation, and Cost Assembly Problems

With the above functional and departmental structure in mind, let us look at the detail methods of accumulating cost data. The emphasis that banks have placed on liquidity has retarded the full development of accrual accounting. While most of the income is reported on a proper accrual basis, some important expenditures are still treated on a cash basis. The outstanding example is the treatment of purchases of equipment and furniture and fixtures. Even today in many banks such purchases are charged directly to current expense (or, if too large, to undivided profits or to reserves previously provided from undivided profits, e.g., a reserve for contingencies). Similarly, in some banks insurance premiums covering three years may be charged to expense in the month in which paid. Therefore, if the cost accountant is temporarily unable to change the accounting practices to bring them into accordance

with generally accepted principles, he must adjust the expense as reported to cost on an accrual basis. In addition, current bad debt losses or recoveries may be replaced by a twenty-year average (as is permitted for Federal income tax purposes).

As in any manufacturing concern, costs must first be allocated on a variety of selected bases to the cost centers or departments. Similarly, income must be channeled to the appropriate department. Expenses of general service departments, such as maintenance in a manufacturing concern, must be charged back to operating departments. Expenses which cannot logically be charged directly to departments, such as donations and institutional advertising, must be prorated to operating units, possibly in proportion to total expenses or some other convenient basis.

At this point, a statement can be prepared which shows the comparative gross yields, costs, and net yields of the various loaning and investing functions, as in Exhibit 1, and likewise, as in Exhibit 2, the comparative costs of various sources of funds can be determined. Net profits from individual services, such as the trust department, can be prepared as single column statements with similar side headings.

LOANING AND INVESTING FUNCTION—COST AND EARNINGS

(000 omitted)

	Total	*Investments*	*Commercial loans*	*Consumer loans*	*Mortgage loans*
Average outstanding	$545,000	$300,000	$200,000	$20,000	$25,000
Gross interest earnings.....	12,900	4,500	6,000	1,400	1,000
Per cent gross yield.....	2.37%	1.5%	3.0%	7.0%	4.0%
Expenses					
Direct to departments.....	1,690	250	650	590	200
Share of service departments	371	56	250	40	25
Share of indirect.....	229	34	100	70	25
Interdepartmental charges ..	(40)	(40)	....	....	....
Total expenses	2,250	300	1,000	700	250
Net interest earnings.....	10,650	4,200	5,000	700	750
Per cent net yield.....	1.96%	1.4%	2.5%	3.5%	3.0%
Average bad debt loss.....	—.12%	....	—.3%	—.1%	—.1%
Yield before cost of obtaining funds	1.84%	1.4%	2.2%	3.4%	2.9%

EXHIBIT 1

OBTAINING FUNDS—COST AND EARNINGS

(000 omitted)

	Total	Bank	Commercial	Savings	Capital
Average deposits	$864,000	$185,000	$585,000	$54,000	$40,000
Less:					
Legal and cash reserves	214,000	50,000	160,000	4,000	....
Float (checks in process of collection)	105,000	35,000	70,000	Nominal	....
Invested funds	545,000	100,000	355,000	50,000	40,000
Average yield* (from Exhibit 1)	1.84%	1.84%	1.84%	1.84%	1.84%
Earnings	10,028	1,840	6,532	920	736
Expenses					
Direct to departments**	3,872	820	2,432	580	40
Share of service departments	465	140	300	85	....
Share of indirect	355	90	250	15	....
Interdepartmental charges	90	90	....	....	....
Total expenses	4,782	1,140	2,982	620	40
Net earnings before income taxes	5,246	700	3,550	300	696
Per cent of average deposits	.61%	.38%	.61%	.56%	1.74%
Per cent of invested funds	.96%	.70%	1.00%	.60%	1.74%

* Yields on various types of loans or investments may be especially allocated to certain types of funds, since usually the kinds and volume of loans depend upon the nature of the available funds.

** Includes interest expense and Federal deposit insurance.

EXHIBIT 2

Assigning Costs to Services: Man-Hour Basis

The total costs of the cost centers must be assigned to the units of production flowing through these centers for cost control, pricing, and other purposes. As salaries represent over fifty per cent of total expenses, cost allocations to services (products in a manufacturing company) may generally be made on the basis of man-hours. The various units of production (measurable in numbers of items processed) for two departments are illustrated below:

Bookkeeping (of checking accounts)	*Tellers*
Debits (checks on us), individual	Deposits, with cash
Debits (checks on us), company	Deposits, without cash
Debits (checks on us), company payroll	Deposits, mail
Credits (deposits)	Checks cashed
Returned checks	Savings Bonds cashed
Stop payments	Approving signature on all checks on us
	Preparing currency and coin for payrolls

After the costs have been applied on the basis indicated to whatever units of production are processed within each department, the costs of each type of unit in the several departments in which its processing occurs are added together to obtain the complete cost of the service or product. A check drawn on the bank might cost:

Checks on us	*Cost per item*
Proof Department	.706¢
Bookkeeping Department	2.080¢
Tellers Department	.236¢
Total cost	3.022¢

Managerial Uses of Cost Data

Although management may of its own volition request certain types of information from the cost accountant, the fullest use of cost data depends upon the ingenuity and initiative of the cost accountant, himself. It is entirely insufficient to compile voluminous data without presenting (usually in written form) an analysis of the significance of the data and the conclusions which may be drawn from them. It is realized, of course, that the solutions of many managerial problems depend upon factors other than costs. In certain instances, factors such as public relations, location, and personnel may be of primary importance. However, costs are usually a factor and frequently an important one. Adequate cost data may help to solve the following problems:

1. Purchase of new machines
2. Make or buy items or services (printing of forms or averaging of checking account balances)
3. Establishment of minimum charges
   - (a) Installment loans
   - (b) Commercial loans
   - (c) Trust services
   - (d) Checking account maintenance
4. Establishment of new branch or affiliate
5. New business campaigns (emphasis on most profitable)
6. Development of new services

More and more, bank management is turning to cost data for assistance in solving problems of determining long-range policies, of measuring the efficiency of operating departments, and of setting prices for a multitude of services.